

## **[SPECIFICATION]**

### **[TITLE OF THE INVENTION]**

#### **HOME NETWORK CONTROL BASED ON TV RECEIVER SET**

### **[BRIEF DESCRIPTION OF THE DRAWINGS]**

FIG.1 is a block diagram of a related art home network system.

FIG. 2 is a block diagram of a home network system according to the present invention.

FIG. 3 is an exemplary view illustrating a screen display method in controlling a home network according to the present invention.

FIG. 4 is a flowchart illustrating a TV controlling process in a home network control method using a TV receiver set according to the present invention.

FIG. 5 is a flowchart illustrating a PC controlling process in a home network control method using a TV receiver set according to the present invention.

### **[DETAILED DESCRIPTION OF THE PRESENT INVENTION]**

#### **[OBJECT OF THE PRESENT INVENTION]**

#### **[FIELD OF THE INVENTION AND DESCRIPTION OF THE RELATED ART]**

The present invention relates to a home network system, and more particularly to, a home network controlling method using a TV receiver set, which is capable of updating equipments of the home network system by downloading update programs of the respective equipments from a server through an Internet network by the TV receiver set.

FIG. 1 is a block diagram illustrating the architecture of a related art home network system. Referring to FIG. 1, the related art home network system includes a home network unit 10 and a service unit 11 connected to the home network in a cable or

wireless communication network to provide information.

The home network unit 10 integrally manages and controls a variety of household appliances through a line in general home or the like, and the service unit 11 is a server system providing a variety of update programs of home network equipments from a server based on Internet.

The home network unit 10 is a line for networking. For example, the home network unit 10 performs a communication/control and power supply using a power cable. The architecture of a home network system using a power cable is illustrated in FIG. 1. Referring to FIG. 1, the conventional home network unit 11 includes a power cable 101 for communication/control and power supply, power line modems 102-105 for communication/control with equipments connected on the network through the power cable 101, and a variety of household appliances connected to the network through the power line modems 102-105. Examples of the household appliances include a PC 106, an air conditioner 107, a washing machine 108, and a microwave oven 109. Meanwhile, the service unit 11 including internet connection and server includes a communication line 111 for communication with the PC, an Internet 112 for connecting the home network unit and the server using the communication line 111, a server 113 for providing a variety of information and update programs to the home network equipments based on the Internet 112, and a terminal 114 for inputting information to the server 113.

In the related art home network system constructed as above, the equipments 106-109 perform data communication through the power line modems 102-105 based on the power cable 101, or they are operated by power. The PC 106 downloads new programs of the equipments connected to the home network and again downloads the new programs to the equipments.

That is, in order to download the update programs, the PC 106 operates and connects to the Internet 112 through the communication line 111. Then, the PC 106 downloads the programs of the equipments from the server 103 and again downloads

the programs to the corresponding equipments through the power line modem 102 and the power cable 101. For example, if a new program for controlling the wind direction of the air conditioner is input to the server 113 using the terminal 114 of the service unit (11) side, the PC 106 downloads the wind direction controlling program through the communication line 111 and the Internet 112, and the downloaded wind direction controlling program is again downloaded to the air conditioner 107 through the power line modem 102, the power cable 101, and the power line modem 103.

In the conventional home network system, the user must directly manipulate the PC 106 to check if a new program exists and download the new program. Consequently, the user is inconvenienced by having to move to the location where the PC 106 is placed and directly manipulate the PC 106.

#### **[TECHNICAL OBJECT OF THE INVENTION]**

It is therefore an object of the present invention to provide a home network controlling method using a TV receiver set, which is capable of using the home network system more conveniently than a case where TV controls the home network. In particular, the home network equipments download updated programs from a server by using TV and transfer the downloaded programs to the corresponding equipments. In this way, the update programs of the home network system can be processed more conveniently, based on TV.

It is another object of the present invention to provide a home network controlling method using a TV receiver set, which is capable of using the home network system more conveniently than a case where TV controls the home network. In particular, the home network equipments download updated programs from a server by using TV and transfer the downloaded programs to the corresponding equipments. In this way, the update programs of the home network system can be processed more conveniently, based on TV, and the respective equipments on the network can be controlled.

It is another object of the present invention to

## **[CONSTITUTION AND OPERATION OF THE INVENTION]**

To achieve the above objects and other advantages, a home network controlling method using a TV receiver set includes: controlling, at the TV receiver set, equipments connected on a home network based on a home network by determining the connection and operation setting states of the equipments; displaying a menu screen related to a home net control on a TV OSD screen in the controlling operation; and downloading a program to the corresponding equipment by controlling a PC according to a download menu when a user selects a download using the displayed menu screen.

In addition, the PC downloads the program to be updated from a server connected to an external data communication network including the Internet, stores the downloaded program, and downloads the corresponding program to the corresponding equipment when the TV receiver set requests the download of the corresponding program.

Hereinafter, embodiments of the home network controlling method using the TV receiver set according to the present invention will be described with reference to the accompanying drawings.

### **[Embodiment]**

FIG. 2 illustrates the architecture of a home network system according to the present invention. Unlike the home network system of FIG. 1, the home network system of FIG. 2 controls the home network based on TV. The home network system according to the present invention includes a TV unit 20, a home network unit 21, and an Internet service unit 22.

The TV unit 20 has a general TV reception function, checks and controls the states of the equipments on the home network, and controls a new program download. To this end, the TV unit 20 includes an antenna 201 for receiving a TV RF signal, a TV signal receiver 202 for selecting the TV RF signals received through the antenna 201 and performing an IF processing and VSB processing, and a video decoder 203 for

decoding a video signal of a broadcasting signal output from the TV signal receiver 202, a CPU 204 for controlling all functions of the TV, including the video decoding, a memory 205 for storing and outputting data of the CPU 204, a VDP 206 for processing a display image signal (GUI) under control of the CPU 204, and a mixer 207 for mixing the output of the video decoder 203 and the output of the VDP 206, an image/deflection processor 208 for displaying the image signal output from the mixer 207 and performing a deflection processing, a CPT 209 for displaying a mixed image signal output from the image/deflection processor 208, an audio processor 210 for decoding and controlling the audio signal of the broadcasting signal output from the TV signal receiver 202, an amplifier 211 for amplifying the audio signal output from the audio processor 210, a speaker 212 for outputting the amplified audio signal output from the amplifier 211, and an interface 213 for performing data communication and control between the CPU 204 and the home network unit 21.

Meanwhile, the home network unit 21 include a power line modem 221 connected to the interface 213 of the TV side to control data communication and home net using TV, a power cable 222 for communication/control and power supply, power line modems 223-226 for communicating with and controlling the equipments connected on the network through the power cable 222, and a variety of household equipments connected to the network through the power line modems 223-226. Examples of the household equipments include a PC 227, an air conditioner 228, a washing machine 229, and a microwave oven 230.

The service unit 22 including the Internet connection and server includes a communication line 241 for communicating with the PC, an Internet 242 for connecting the home network unit and the server using the communication line 241, a server 243 for providing a variety of information and update program to the home network equipments based on the Internet 242, and a terminal 244 for inputting information to the server 243.

The operation of the TV unit 20 in the home network system using the TV

according to the present invention will be described with reference to FIG. 2.

The antenna 201 receives the TV RF signal and supplies the received TV RF signal to the TV receiver 202. The TV receiver 202 selects the broadcasting channel of the received TV signal, performs the IF processing and detection of the selected broadcasting signal, and separates the audio and video packets from the broadcasting signal. The audio packet is supplied to the video decoder 203, and the audio packet is supplied to the audio processor 210.

The video decoder 203 decodes the selected video packet (video stream) and supplies brightness and color difference signals Y/U/V to the mixer 207. The mixer 207 mixes the GUI image signal separated by the VDP 206 with the brightness and color difference signal, and supplies the mixed signal to the image/deflection processor 208. The image/deflection processor 208 performs the signal processing and deflection processing for displaying the input image signal, and displays the processed signal through the CPT 209.

Meanwhile, the audio processor 210 decodes the audio packet, performs a tone control, amplifies the decoded audio packet through the amplifier 211, and outputs it through the speaker 212.

The operation including the selection of the TV broadcasting and the processing and outputting of the audio/video signal is performed under control of the CPU 204. The memory 205 stores data necessary for the control of the CPU 204, or outputs the stored data.

The interface 213 is a means for performing the communication and control with the TV and the home net. For example, the interface 213 is a serial communication interface. The CPU 204 performs the program download to the home network unit 21 through the interface 213, and searches the states of the equipments. To this end, the home network unit 21 is connected to the interface 213 through the power line modem 221, is controlled by the TV, and transfers the equipment state information to the TV.

Therefore, the home network unit 21 establishes the home network using the

power cable 222. The equipments 227-230 transmits/receives data through the power line modems 223-226 or is controlled. Especially, the communication with the TV is performed through the modem 221 connected to the power cable 222.

Meanwhile, the Internet service unit 22 connects the PC 227 to the Internet 242 through the modem 241 and inputs the information to the server 243 through the terminal 244. The server 243 provides the information to the home network system side through the Internet 242 and the communication line 241.

The process of downloading the new service programs of the equipments on the home network using the TV in the above-described home network system will be described below in detail with reference to FIGS. 3 to 5.

First, FIG. 3 illustrates an exemplary home net menu screen according to the present invention.

When the home net is selected, the main screens 30 and 31 for controlling the home net are displayed. At the early stage of the home net selection, the menu screen is displayed like FIG. 3(a). On the menu screen are displayed a menu screen 301 for the air conditioner 228, a menu screen 302 for the washing machine 229, a menu screen 304 for the microwave screen 230, and other control menu screens (not shown) for household equipments on the home network, like a menu screen 304 for a kimchi refrigerator. In the displaying of the menu screen, the CPU 204 controls the VDP 206 according to a command input by the user, and the corresponding menu screen is output like a kind of an OSD screen. Therefore, the menu screen like FIG. 3 can be displayed on the CPT 209.

FIG. 3(b) illustrates a sub-menu screen that can be displayed when the program download item for the air conditioner is selected in the main screen, including a wind-direction download list menu 301a and a select menu 301b for selecting whether to execute the download for the selected wind direction selected in the download list.

As illustrated in FIGs. 3(a) and 3(b), the selection of the program download by the user watching the menu screen is performed by the processes of FIGs. 4 and 5. FIG. 4

illustrates the process of controlling the home net and the program download by the CPU 204 at the TV side, and FIG. 5 illustrates the process of controlling the Internet connection and the program download at the PC side.

The process of controlling the home net and the program download by the CPU 204 at the TV side will be described with reference to FIG. 4.

After the start step 401, the CPU 204 executes a TV main routine (step 402). In step 403, the CPU 204 checks the connection states of the respective equipments 227-230 through the serial interface 213, the power line modem 221, the power cable 222, and the power line modems 223-226 of the respective equipments, and downloads the states of the corresponding equipments through the serial interface 213 (step 404). The equipment state values are stored in the memory 205 (step 405), and the input of the remote controller key values is checked (step 406).

If the user inputs the key values using the remote controller, the CPU 204 determines if the key input value is a home net command (step 407). If the key input value is not the home net command, the process returns to the TV main routine (step 402). If the key input value is the home net command, the home net menu (see FIG. 3(a)) is displayed on the CPT 209 (step 408).

The home net main function is executed (step 409), and the user manipulates the remote controller to check the input of the menu selection value (step 410). In step 411, it is determined if the menu selection value is the selection of a download related item. If the menu selection value is not the selection of the download related item, the process proceeds to step 412 to determine if it is the end input. If the menu selection is the end key, the process proceeds to step 418 to terminate the algorithm. If not, the process returns to step 409 to perform the home net main function.

If the download is selected in the step 411, for example, if the download is selected from the air conditioner menu screen 301 like in FIG. 3(b), the download menu screens 301a, 301b related to the air conditioner are displayed (step 413).

However, if the download is not selected, it is determined if the cancel key is



input (step 415). If the cancel key is input, the process proceeds to step 418 to terminate the algorithm. If not, the process proceeds to step 413 to display the download menu screen.

If the user selects the download in the displayed download menu screen, the program for the corresponding menu is downloaded from the PC 227 to the corresponding equipment (step 416, step 417). That is, as described above, the CPU 204 communicates with the PC 227 through the serial interface 213, the power line modem 221, the power cable 222, and the power line modem 223. A new program for the corresponding equipment (herein, a new program for controlling a wind direction of the air conditioner) is downloaded from the PC 227 to the corresponding equipment through the power line modem 223 and the power cable 222. The download value is stored and the process is terminated (step 418).

A process of controlling the program download in the PC side will be described below with reference to FIG. 5.

After a start step 501, the PC 227 executes the PC main routine (step 502) and connects to the server 243 through the communication line 241 and the Internet 242 (step 503). The download list is read from the server 243 (step 504), and it is determined if a new program exists in the read download list (step 505). If the new program does not exist, the process proceeds to step 506 to set an equipment variable  $M(n)$  to '0'. Then, the process proceeds to step 509.

If the new program exists, the program is downloaded and stored (step 507), and the equipment variable  $M(n)$  is set to '1' according to the download of the new program (step 508). For example, it is assumed that  $M(1)$ ,  $M(2)$ ,  $M(3)$  and  $M(4)$  represent the air conditioner, the washing machine, the microwave oven, and the kimchi refrigerator, respectively. If new programs for the air conditioner and the microwave oven exist,  $M(1)=1$ ,  $M(3)=1$ ,  $M(2)=0$ , and  $M(4)=0$ . The value of  $n$  (which represents that the number of the equipments are four) is set to 4 (step 509). According to the result of determining if the download was performed with respect to a certain equipment, the

corresponding download variable  $Sa(n)$  is stored and the process proceeds to steps 510 to 514.

That is, it is determined if  $M(n)=1$  in step 510. If  $M(n)=1$ , it means that the new download program exists with respect to the equipment  $n$ . The download program  $Pg(n)$  is downloaded and stored in the variable  $Sa(n)$ . While decreasing the value of  $n$  by  $-1$  in steps 512 and 513, the process repeats from step 510 until  $n$  is equal to 0. Whether to download the new programs for the corresponding equipments  $M(4)$ ,  $M(3)$ ,  $M(2)$  and  $M(1)$  ( $n=4, 3, 2, 1$ ) is stored in the corresponding variables  $Sa(n)$ .

#### **[EFFECT OF THE INVENTION]**

According to the present invention, the home network system is controlled using the TV. When the new programs for the equipments connected on the home network are provided to the server, the programs to be updated can be downloaded to the corresponding equipments through the PC by using the TV.

Therefore, the system according to the present invention can solve the inconvenience that the user must move to the location where the PC is placed and manipulate the PC to download the corresponding program download. The update programs for the equipments can be downloaded by simple manipulation of the remote controller using the OSD home net menu screen, while the user is watching on TV.